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ABSTRACT

Qualitative/naturalistic inquiry intends to discover whatever naturally occurring order exists rather than to test various theories or conceptual frameworks held by the investigator. Naturalistic, ecological data are urgently needed concerning the behavior of educational administrators. Such data can considerably change the knowledge base of the field and may also speak to such operational concerns as management and planning. A running narrative record called a chronolog has been developed at Indiana University that can be used to reliably collect such data. Studies so far have investigated the behavior of a university administrator, superintendents, principals, school psychologists, and child advocates. An earlier study using a similar method explored differences between effective and ineffective teachers. Potential contributions of naturalistic methodologies to the overall study of administrative behavior are discussed. (Author/MLF)

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Ecological Methods in the Study of Administrative Behavior

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Paper presented at AERA meeting April 12, 1979, San Francisco

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Ecological Methods in the Study of Administrative Behavior

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The behavioral sciences in general and psychology in particular have been noticably deficient in the collection and analysis of naturalistic and descriptive data. This is in marked contrast to the older and more prestigious natural sciences in which such investigations are a central and continuing task. Barker (1965) points to the success of these efforts when he says:

> "I read, for example, that potassium (K) ranks seventh in order of abundance of elements, and constitutes about 2.59% of the igneous rocks of the earth's crust; that its compounds are widely distributed in the primary rocks, the oceans, the soil, plants, and animals; and that soluable potassium salts are present in all fertile soils (Encyclopedia Britanica, 1962). The fact that there is no equivalent information in the literature of scientific psychology (about playing, about laughing, about talking, about being valued and devalued, about conflict, about failure) confronts psychologists with a monumental incompleted task" p. 6.

Willems, (1973) tells a provocative little story which illustrates well the need for naturalistic data not only to advance knowledge but for use in sound program planning as well.

> "An ornithologist with a European zoo wished to add a small, rare bird called the bearded tit, to the zoo's collection. Noting that other attempts to maintain the bird in captivity had been unsuccessful, he invested a great deal of time and painstaking effort to summarizing what was known about the tit's habitat and life style. Armed with all this information, including many photographs, the ornithologist built an

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extensive setting for the tits in his zoo, being careful to include exactly the right proportion and distribution of shrubs, trees, grasses, rocks, and lighting. After the designed environment satisfied him, he introduced a male and female to it. He noted that, by all reasonable indicators, the birds loved it. They sang, ate, drank, flitted about, groomed, mated, built an appropriate nest, laid eggs, hatched babies, and fed them. If birds can be said to enjoy their environments, then, by all these behavioral criteria, the ornithologist had created an environment whose habitability the bearded tits enjoyed thoroughly.

(See Insert A - next page)

He tried modifications, but none forestalled the infanticide. Finally, in desperation, he went back out to observe tits in the wild. After many hours of observation, he noted three clear patterns of behavior. One was that throughout most of the daylight hours the parent tits were almost frantically active at finding and bringing food for the infants. Second, the infants, with whose food demands the parents could hardly keep pace, spent the same hours with their mouths open, apparently crying for food. The third pattern was that any inanimate object, whether eggshell, leaf, or beetle shell, was quickly shoved out of the nest by the parents.

With these observations in mind, the ornithologist went back to observe his captive tits and what he found astounded him because of its subtlety, and yet its clarity. During the short time a new brood of infants lived, the parents spent only brief periods feeding them by racing between the nest and the food supply, which the ornithologist had supplied in abundance. After a few moments of such feeding, the infants, apparently satiated, fell asleep. The first time the infants slept for any length of time during the daylight hours, the parents shoved them - two inanimate objects, after all - out of the nest. When, by making the food supply <u>less</u> abundant and <u>less</u> accessible, the ornithologist made the parents work much longer and harder to find food, he found that the infants spent more daylight time awake, demanding food, and that the tits then produced many families and cared for them to maturity" p. 201.

Both of these illustrations point to the urgent need for more naturalistic investigations of human behavior. Nowhere is this more true than in the study of administrative behavior in educational settings. Principals, superintendents, deans and other educational leaders are thought to be in crucial positions to influence the optimal learning

Insert A

Within a day or two, however, the zookeeper came to check the tits, only to find the babies dead on the ground. Since the parents were still so clearly enjoying themselves, he assumed that some accident or illness had befallen the infants, and he waited for the reproductive cycle to recur. When a new brood was hatched, the ornithologist observed carefully and found, to his dismay, that after a day or two the parents pushed the babies out of the nest, onto the ground, where they died. This cycle, beginning with mating and ending with the babies dead on the ground, repeated itself over and over again, and the ornithologist realized that he had somehow created an environment so unhabitable that he would not be able to keep tits in captivity unless he brought in successive wild-born babies or changed the captive environment in some fundamental way.

and development of the students, faculty and others in their charge. Yet almost nothing is known about the naturally occurring behavior of successful (or unsuccessful) persons in these positions. How many times, for example, does a principal experience frustration during a day? What are the modes with which he or she responds to such frustration? Which of these modes most frequently leads to goal achievement? No one knows. And what is the context of behavior in the natural habitat? Do varying environments lead to varying amounts of frustration in principals? It seems a likely hypothesis but no data are available to shed light on these important questions.

Definitions

It may be helpful here to define a few basic terms before proceeding further in order to clarify the conceptual bases to which this work is related. Naturalistic as used here refers to studies done in the natural habitat. As used here, it also carries a connotation of matching both the questions being asked and the methods employed as closely as possible to that natural habitat. The reader should be warned that the term is frequently used in the literature to carry only the place connotation referring to where the study is conducted. Other writers, on the other hand, do include the conceptual matching criterion. In short, there is, at present, some confusion with regard to the use of the word naturalistic and these substantial differences in meaning may lead to noncomparability of studies.

Environment as used here refers to the physical surroundings, including both objects and other physical characteristics such as temperature,

light, color, etc. The environment may, of course, affect behavior but the term does not include behavioral characteristics as part of its definition.

Ecology as used here refers to all the surround for behavior. It includes the physical characteristics such as objects, temperature, etc. but it also includes behavior-like attributes such as roles and social rules. The best example of the use of this definition is Barker's (1968) construct behavior setting.

Again, there is some confusion in the literature concerning the terms environment and ecology. In some places they are used as described above, in others they are used synonymously, and in others still other definitional attributes may apply. Again, the reader is cautioned to determine the definitional framework of each study carefully so that appropriate comparisons can be made. As mentioned above ecological psychology shares certain goals with some components of the natural sciences.

Comparisons of Ecological and Other Methods

It also holds some characteristics in common with certain other behavior sciences such as human ecology, social anthropology and ethology. Chief similarities between these fields appears to be (1) a focus on the natural habitat as the site for research, (2) the descriptive nature of the goals of the research, (3) the use of descriptive methods such as direct observation to achieve these goals and (4) taking care to interrupt or disturb the natural course of events as little as possible. Schoggen (1978) discusses differences between ecological psychology and these

other areas and notes, for example, that "human ecology has been concerned primarily with variables at the demographic level, e.g., spatial distribution, crime rates, incidence of delinquency, and mental illness in relation to environmental characteristics such as areas of the city" p. 33. When compared with social anthropology, ecological psychology (1) takes a more strictly psychological conceptual and theoretical perspective and (2) attempts to develop new field research methods which are more systematic and more readily quantifiable. p. 36. Perhaps ecological psychology has most frequently been compared with human ethology and they do share the features mentioned above. As Schoggen (1978) points out, however, there are also some significant differences. (1) Ethology has focused more on an evolutionary framework and has been particularly interested in the survival value of the behaviors which were observed. (2) Behaviors of interest to the ethologists have tended to be at the molecular level in contrast to the molar ones of the ecological psychologists. (3) Ethologists have focused on the behavior of the persons and groups whereas ecological psychologists have been equally interested in describing, classifying and taxonomizing the environment for that behavior. p. 39f.

Roger Barker (1965) provides another way of discriminating between ecological psychology and other areas of the study of human behavior. He points out that behavior exists without the benefit of psychologists but that behavioral data are the joint product of the behavior and the psychologists. He then describes two data generating systems in which the role of the psychologist differs, one called an Operator (O) system

and the other a Transducer (T) system. In both systems the psychologist records data on behavior as it occurs in some environment. In the O system the psychologist performs some operation upon the person, environment or both before data are taken. In the T system the psychologist does not operate but simply transduces, or transcribes, data on behavior as they occur naturally. Barker (1965) gives a nice illustration which contrasts the two methods.

> "Take intelligence, for example. Millions of reliable and valid intelligence tests have been administered, scored, and reported, thus providing a vast store of O data, for psychologists are strong operators in test situations, supplying input ("What do we mean by courage?", regulating interior conditions ("Work carefully; speed is not important"), and constraining output ("Underline the correct response"). These data provide basic information about intellectual functioning within test-score generating systems, and about intellectual processes and their constants: about IU, about g, about verbal factors, etc. But this great and successful scientific assault upon the problem of intelligence has provided almost no information about the intellectual demands the environments of life make upon people, and how people respond to the "test items" with which they are confronted in the course of living" p. 4.

Ecological psychology, then, is a transducer science and is designed to fill exactly this gap in the information about human behavior.

Purposes

It is important to be as clear as possible about the purposes of ecological research and to discriminate what it will and what it will not do. The main purpose of ecological research is descriptive - to identify, describe and classify the behaviors of persons as they interact with their environment. As noted above it is this type of information which is largely lacking in the field of psychology. Such research may

also be used for comparative purposes. Studies of the behavior individuals or groups as they go about their everyday business may be compared with other studies of other individuals or groups. Of interest here, for example, might be the behavior of administrators working under differing organizational frameworks.

What ecological research is not intended to do is to conduct experiments or test empirical hypotheses. As mentioned above the word naturalistic is sometimes used in the literature to refer to such laboratory-experimental type research which was simply moved to the natural habitat when it was conducted. This is not to be confused with ecological research, however, as construed by Barker and his colleagues.

Ecological Methods

The chronolog. The main method for studying behavior in the natural habitat which we have been developing here at Indiana University for the past two years is called a chronolog. It is based on the earlier development by Barker and Wright (1955/1971) of a technique called a specimen record. A specimen record is a running, narrative record of all of the behavior of an individual. The observer simply records everything which the subject says and does and everything which is said and done to him or her at the molar level. Molar level means within the normal everyday perspective of the person as viewed by that person. An excerpt from such a record might sound like the following. "Mike Jones picked up the phone. He dialed a number. He drummed his fingers absently on the desk as he waited. Suddenly he smiled and said, "Hello, George. This is Mike. I'm

calling about the workshop on Saturday." The specimen record does not record behaviors at a molecular level such as "Mike moved his left arm forward toward the telephone. He coiled his fingers around the receiver. He lifted the receiver to his left ear. He moved his right hand forward toward the telephone. He dialed the number 7." Nor does the observer record behaviors at a larger global level such as "Mike Jones worked hard to get promoted." It is the intent of a specimen record to capture behavior in the context of its everyday meaning for the actor himself or herself. It is this level which is meant by Molar (Scott, 1976).

The chronolog has many similarities to the specimen record. It is a running, narrative record of an individual's behavior. It records the context of that behavior, including the behavior of others. It records behavior at a molar level. But it records behavior at a somewhat larger molar level than does the specimen record. A chronolog of the behavior scenario above might read like the following. "Mike made a call. He talked to George about the workshop on Saturday." The chronolog still records all of the major ongoing behaviors of the individual. It also records his or her speech but it does not record it verbatim. Rather, it attempts to summarize and capture the gist of what was said. It records all of the behavior in the molar stream giving careful attention to detail at points where the behavior changes in direction and keeping a running summary in between. In this respect the chronolog shares some features with a chronicle, a method developed by Gump (1967) for recording the behavior of groups. Both the specimen record and the chronolog keep a running

record of the time the behavior is occurring and note these times in the margin of the record for later analysis.

Observational procedures. The chronolog is taken with the aid of a Stenomask. The Stenomask is a sound shielded microphone attached to a portable tape recorder. The handle of the Stenomask contains the microphone switch and the recorder is worn on a shoulder strap. This permits the observer the flexibility of following the subject wherever in the natural habitat he or she goes. (This procedure has been described in detail elsewhere (Schoggen, 1964).) Two procedures preceed any data taking. The first is orientation of the subject and as many other persons in the environment as are likely to be present during observations. During this phase the study is explained to the subject and others, the equipment is demonstrated, a sample record is presented and any questions answered. Methods typically found helpful in reducing any potential effects of the observer to as near zero as possible are also discussed. Once this orientation has been accomplished, adaptation begins. During this phase, the observer goes into the habitat and behaves exactly as he or she will during the actual recording. They wear the Stenomask, follow the subject about and run the machine, taking mock records. The purpose of these activities is exactly what is implied in the title, to adapt the subject and others in the environment to the presence of the observer and to reduce the effects of that presence to as near zero as possible. The cardinal rule for the observer during this time is to be completely nonresponding. It has been demonstrated over and over again that, if the observer continues to resist all social stimuli from the subject and

others (and some will occur despite the most careful orientation) by simply keeping the mask in place, looking busily at work and remaining nonresponding, both subjects and others soon cease emitting stimuli to the observer and come to truly accept him or her as a present and sometimes mobile but completely nonresponding part of the environment, perhaps somewhat like a rolling chair. Several clues indicate to the observer that this has happened. First, the behavior of the subject settles back down to near normal. It ceases to look stilted and on parade. Examples include a more relaxed posture, less formal speech and less "etiquette book behavior." Another good clue in this regard is the more uneven rate of normal behavior rather than the more steady rate of contribed behavior. Secondly, a wider range of behaviors is presented by the subject. The narrow range prescribed by social acceptibility is broadened and more behaviors appear. Examples here would include scratching, expletives and long periods of silently staring into space. Thirdly, the behavior of the other persons who normally people the subject's environment provide good clues as to the normalcy of the subject's behavior. If the person being observed does something unusual, eyes of others in the environment immediately turn to the observer. Such incidents gradually drop out during adaptation. When all or most of these clues have occurred, actual data taking can begin.

The actual making of a record follows several steps. The first step is the taking of the field notes through the Stenomask. When the observational period has ended the observer returns to the office and transcribes the notes, mostly from the tape, but also smoothing out

the record a bit, perhaps adding details in places where a series of behaviors occurred very rapidly (for this reason it is important to transcribe the field notes immediately following the observation) and perhaps adding clarifying descriptions in others. This rough copy of the record is then edited to deidentify names and places and to make sure that the record reflects as accurately as the observer is able the naturally occurring, ongoing behavior of the subject during the observational period. The rough copy is then typed into final form and is ready for analysis.

Observer Influence and Reliability. The question of observer influence upon the behavior being observed is one which is frequently raised by persons just beginning to study the field of naturalistic inquiry. Several points are relevant to this question. In the first place, the observer has only two choices - either the subject knows that the observer is there or he or she doesn't. The second alternative is effectively unavailable to persons who work with human beings due to ethical and human subject considerations. Secondly, it is at least reasonable to suppose that, since the subject does know of the observer's presence, there may be some effect, however small, and that it may be impossible to reduce these effects entirely to zero. The question is then transformed into the following two: (a) how to reduce the observer effects to as near zero as possible and (b) how to make whatever residual effects are present as systematic as possible across the entire behavior sample (Wright, 1967). The former is handled by training of and practice by observers in being completely nonresponding. This, in effect, puts the subject on an extinction curve with regard to response and has been

shown to be very effective. The second question, that of systematizing observer effects, is handled in part by the orientation and adaptation procedures and in part by standard observational practices such as low profile following techniques, etc.

The question of the reliability of the records is, at one level, a question of the selective perception of the observer. This is handled, in part, by observer training and, in part, by recording practices. The observer is rigorously trained to record all of the behavior of the subject, to record only the behavior, to make no interpretations and to make only those low level inferences necessary to provide context for the behavior. Editing of the records and, sometimes, interrogation of the record by a fellow observer also helps in this regard. An environmental factor which provides further protection against selectivity is the time constraint. Human behavior, as it occurs in the natural habitat, often happens at such a rapid rate that there is not time to select features of the behavior for reporting. In this case the observation task becomes somewhat like straight copy typing for a typist.

At another level, the reliability of narrative records is a very complex problem (Schoggen, 1978). As Wright (1967) notes, such records have not one reliability but many, one for each behavior under consideration. Secondly, the records must be put through at least one and sometimes two data reduction steps before reliability can be assessed. It then becomes unclear whether the reliability of the observation or the reliability of the data reduction is being assessed. Older methods for assessing reliability, using simply percent of agreement for any given unit or

category, have shown narrative records to be quite high. In a recent study by Dreher and Willems (1976) it was reassuring to note that a complex method which attempts to separate the amount of variance attributable to observing from that attributable to coding also showed high reliability of narrative recording.

Analysis of Ecological Data

The analysis of narrative records ordinarily proceeds in two steps. The first step is unitization of the records. This is followed by categorization of the units.

Unitization. The main unit which has been used so far with chronologs is called an Activity Unit (AU). An AU is a naturally occurring chunk of behavior within the normal everyday perspective of the actor himself or herself. It has identifiable beginning and end points and proceeds in the same psychological direction throughout its course. In general, the individual whose behavior is being unitized is pursuing the same activity during each of the AUs. When the activity changes, a new unit is marked. Continuous bracket lines are used to indicate individual AUs. AUs may also be proceeding simultaneously in any one of several overlapping patterns. When the AUs are marked they are then given titles. These titles attempt to describe very briefly the activity in progress in the unit. The key to the title is an action verb, usually ending in ing; for example, hanging up coat, giving instructions to secretary, meeting with Dave Wright, writing curriculum report, etc.

The most commonly used method for determining reliability of units such as the AU is simply percentage of unitizer agreement. Wright (1967)

presents the following formula for determining unitizing accuracy (modified for AUs):

$$\text{Estimate of Accuracy} = \frac{\text{AUs Marked by Person 1 Also Marked by Person 2}}{\frac{\text{AUs Marked by \#1} + \text{AUs Marked by \#2}}{2}}$$

where person 1 and person 2 have unitized the record independently. Once the individual AUs marked by each person have been noted for the purposes of assessing reliability, each disagreement is then discussed between the two and reconciled. This results in a "frozen copy" of the record which becomes the final working copy for further analyses. Reliabilities of these continuous, running, structural units such as AUs can usually be brought to a high level fairly quickly. Reliabilities for AUs in the work done here at Indiana so far have typically run in the .80s after only a few training sessions and have typically run in the .90s with experienced unitizers. Such agreement argues still further for the ecological validity of the unit. As reported above, Dreher and Willems (1976) have also found quite high reliabilities for such records using a much more complicated formula.

Other types of units have also been used to unitize narrative records. Schoggen (1963) has identified a unit called an Environmental Force Unit (EFU). In records of children Schoggen has defined an EFU as "an action by an environmental agent which: (1) occurs vis-a-vis the child, and (2) is directed by the agent toward a recognizable end-state with respect to the child, and (3) is recognized as such by the child" p. 43. How very interesting it would be to investigate the environmental forces

impinging upon the daily behavior of principals. What percentage of their time do they spend responding to these external stimuli? What is the nature of these stimuli with respect to goal, mechanisms used to accomplish the goal, etc. One might then proceed to a comparative study of the relative effects of environmental forces on effective as contrasted with ineffective principals, elementary as contrasted with secondary, and so on.

Another type of unit with which we have been working here at Indiana is called a Problem Solving Event (PSE) (Scott, 1978). A PSE is defined as (1) a naturally occurring unit (2) within the normal everyday perspective of the subject (3) which has recognizable beginning and end points (4) which proceeds in the same psychological direction throughout its course and (5) which shows clear evidence of some situation requiring a solution, some barrier to be overcome or some tension to be reduced. PSEs, like AUs, are given short, action verb titles such as trying to get dime from mother, rescuing kitten from tree, trying to say wasps. Again, these units are thought to be applicable to the study of chronologs of adult behavior. For example, in the chronologs of a university administrator's behavior it is clear that he encountered a number of such PSEs during a week. Examples might include trying to get coffee machine to work, calling faculty member to discuss student complaint, meeting with administrative council to make final budget cuts.

Categorization. Once the chronolog has been unitized then each AU is coded according to whatever categories are of interest in any given study. It has by now occurred to many readers that these units

vary along a number of dimensions. They are of uneven length, psychological weight or importance, number of people involved, strategies employed, etc. Just so. This second step of categorization is designed to investigate the dimensions along which the units of naturally occurring behavior vary. It should be pointed out, however, that variation of individual units along any one of several dimensions does not affect the occurrance or nonoccurrance of the unit itself. In fact, it is this attempt to first discover the naturally occuring structure of whatever behavior is presented and of then typing the category system to that structure which differentiates ecological research from other forms of behavioral research. A number of other methods in the behavioral sciences employ category systems. What is often not done in these methods, however, is to tie the use of such category systems to the naturally occurring structure of the behavior.

The categories for any given study should be generated based on the question(s) under investigation. They should also be tied to the unit selected for the analysis of the behavioral data collected. Several categories which have been found to be useful in analyzing naturalistic narrative records are presented below.

1. Length of AU. Each AU is coded for duration to the nearest minute. Such structural characteristics in behavior have been shown to vary among individuals. Effective teachers, for example, demonstrate longer structural units to their behavior than do ineffective ones (Scott, 1977).

2. Type of overlap. Each AU is coded for the type of overlap, if any, which it shares with any other AU. AUs, as they relate to other AUs, may be enclosing, enclosed, or interlinking, for example (Wright, 1967). Barker and Wright (1955/1971) have shown that as children get older they demonstrate more overlapping types of behavioral units. It appears that increasing complexity of behavioral patterns is related to increasing maturity in children. Whether this pattern is sustained throughout the life course is not known. It is also not known whether other measures which may be related to increased maturity such as increased effectiveness are also related to increasingly complex behavioral patterns.

3. Initiation-Termination. Each AU is coded as to whether it was begun by the subject or some other person or event and as to whether it was ended by the subject or some other person or event. This code has been related to autonomy (Scott, 1977) and effective teachers have been shown to initiate far more of their own behavior than do ineffective ones.

4. Goal. Each AU may be coded as to the type of goal addressed in the unit. This category has received little attention in recent years and needs further study.

5. Mechanisms. Each AU may be coded as to the mechanisms which the subject used to accomplish the goal of the unit such as verbal, physical, gesture or signal, or various combinations of these three. Again, effective teachers have been shown to use a greater frequency of combined mechanisms in their behavioral units, perhaps providing a richer stimulus environment for learners (Scott, 1977).

6. Participation. This category codes the level of involvement of the subject in the behavioral unit from 1 (low) to 5 (high). Effective teachers have been shown to be more involved more of the time in their behavioral units than ineffective ones (Scott, 1977).

7. Specificity. This category codes the number of other persons, if any, who were involved in the behavioral unit with the subject. Educational administrators are seen as frequently involved in direct face-to-face encounters with people. Yet they are also portrayed as thinkers, planners and behind-the-scenes movers of people, implying a more solitary set of behaviors. Almost surely they engage in both sets but in what relative proportion? And to what is differential apportioning of these differing types of behaviors related? No one knows.

The number and variety of categories which may be generated are virtually endless and, as mentioned above, should be related to the primary purposes or questions of the given investigation. So little is known at present about the naturally occurring behaviors of educational administrators that almost any data, if rigorously collected, would be useful.

Selected Findings

A first study using the chronolog methodology is underway at Indiana University of the behavior of an educational administrator in a university setting. Full day chronolog records were taken on an associate dean throughout an entire week. Rotating observers followed this administrator from the time he arrived at the office in the morning until he left again at night through all of the activities in which he engaged for one full

week. Lunch and bathroom were excluded as was one one-hour meeting on a confidential matter. During this time the associate dean attended meetings, made phone calls, worked on reports and went to another city for meetings and consultation with persons there. The chronologs provide a very rich account of the naturally occurring behaviors in the everyday life of an educational administrator. Further, they provide for the first time, so far as is known, continuous behavioral records over several days of an adult in the natural work habitat. All of the records have now been transcribed, edited, deidentified and made ready in final typescript form. The main analysis will begin shortly. Preliminary analysis of several subportions of this data bank have yielded some very interesting findings. First, reliability of observations of this type appears to be comparable to previously reported estimates, ranging between .83 and .87 on initial runs. These reliability data were taken with two observers simultaneously following the subject for some periods during the day. Secondly, the behavior of this administrator does appear to show complexities not heartofore described in the literature. These naturalistic samples show that behavioral units did, in fact, carry over from one time period to another. There is a continuity when one examines the behavior that may not be adequately captured by any of the analysis units previously used. A new unit would appear to be needed, perhaps called something like a continued unit. At any rate, several strategies may be needed in order to adequately describe the naturally occurring complexity of this behavior.

The work of Robert Owens and his colleagues here at Indiana University is another new start in the naturalistic study of administrative behavior. You have heard Owens report on this work earlier including its strong influence from ethology. Ethologists call the species specific patterns of behavior which they attempt to construct from field observations ethograms. The work of Owens and his group appear to have as an overall aim the construction of such patterns for educational administrators (adminograms?) with subcomponent patterns for principals (princograms?), superintendents (supergrams?), etc. Such work has enormous potential to add to the information available on the practice of educational administration. Two studies conducted under Owens' direction are of particular interest here because of their methodological implications.

Reynolds (in preparation) was interested in naturalistic parameters in the functioning of administrative teams. He took chronologs on the behavior of superintendents as they functioned as the leader of their administrative team during team meetings. All teams had been nominated by peers as being effective. Preliminary analyses revealed some very interesting patterns. During the approximately two hours of team meetings superintendents emited, on the average, about 30 Activity Units (AUs). Each AU lasted, on the average, about five minutes. Superintendents initiated about 70% of their own AUs and most frequently functioned in a role of co-contributer. There was some variation in role function across superintendents, however, with some superintendents functioning as a major presenter most frequently. The mechanisms which superintendents most frequently used to implement their activities were

mixtures of information giving, question asking and giving of directions. The most frequent single mechanism used by superintendents was providing information. Superintendents most frequently dealt with combinations of content during their AUs, with administrative items, special issues and school employees occurring most frequently as single contents. It was interesting to note that no superintendents dealt with financial matters during the team meetings. When decision making was studied it was discovered that 60% of the superintendent's behavior was involved in AUs requiring no decision, 6% in AUs which required a decision but none was made and 23% in AUs where the superintendent made the decision. It was again interesting to note that in only 10% of the AUs was the decision made by consensus of the administrative team. Some very interesting questions could be raised as to actual functioning of these administrative teams in decision making.

Lehaman (in preparation) collected full day chronologs on principals who had received multiple nominations as being effective in their job performance. These records were then divided into units which shared some characteristics with AUs but which appeared more like Dreher and Willems' (1976) chunks. Lehman notes that a unit was marked for every "main activity" in which the principal engaged, thus only single units were possible and no overlapping units were marked. Further analysis of these units showed that effective principals spent an average of 28.1 percent of their time on activities relating to curriculum and instruction. This is followed by student personnel matters which consumed 22.6% of an effective principal's time, on the average. Personal matters,

including lunch, ranked third (17.2%) and staff personnel matters fourth (13.8%). It is also interesting to note, however, that principals showed wide individual variation on each of these categories. In this case it appears that the range is at least as interesting a measure of the behavior as the mean and may deserve further investigation. Further comparative work could now also proceed with the extension of the data collection to other principal groups.

An earlier study from our own laboratory (Scott, 1977) examined the naturally occurring behavior of effective teachers as contrasted with ineffective ones. This study collected specimen records rather than chronologs and data were taken in two behavior settings, Morning Greeting and Large Group Instruction. First, some differences occurred between effective and ineffective teachers irrespective of setting. Effective teachers showed greater length to their running, structural behavioral units (called episodes in this study) which was posited as being related to greater behavioral organization, integration and smoothness. Effective teachers also showed more goal attainment and more positive affect than did ineffective ones. A second finding of considerable interest was that the behavior of all teachers changed markedly as they moved from setting to setting. Some settings exerted much stronger coercion than did others and behavioral differences between effective and ineffective teachers tended to decrease. For example, wide individual differences occurred in the behavior of teachers during behavior setting: Morning Greeting but many of these differences were reduced during behavior setting: Large Group Instruction where the behavior of all teachers was

more similar. It is interesting to speculate as to whether this would also be true for educational administrators. If so, one long range implication of such findings might be that administrative effectiveness might be increased by differentially arranging the settings in which individuals are required to function.

Diepold (1978) took full day chronologs of a number of school psychologists as they went about their daily activities in what appears to be the first study of its kind for this population. Diepold also asked each psychologist to estimate, at the end of the observational day, the amounts of time spent doing various tasks. He was interested in roughly assessing the accuracy of a great deal of previously reported literature on the functions of school psychologists based on such self reports. It is very interesting to note that, even though the psychologists were reporting on a day just completed, there were gross inaccuracies on the part of every psychologist with an average overestimation of 3 hours, 17 minutes for an average day of 6 hours, 8 minutes. School psychologists were best at estimating the amount of time spent directly with students ($r = .91$ for estimated vs observed). They were considerably poorer at estimating amounts of time spent in activities which they did alone ($r = .21$ for estimated vs observed). These data suggest not only that self reports are demonstrably inaccurate but that they are differentially inaccurate as a function of differing tasks. Diepold's data point again to the tremendous need for more direct naturalistic observations of human behavior and to the vast differences in the data base which may result as a function of such methodologies.

Rosenthal (1977) collected a rudimentary form of full day chronologs on child advocates working in institutions for retarded children. A very surprising finding from this study was the fact that transit (moving from building to building) ranked first in terms of numbers of contacts (fourth in terms of amount of time spent) among all categories of behavioral activities in which the advocates engaged during their working days. Ranking first in terms of amount of time spent (fourth in number of contacts was documentation, administration, records, etc. Ranking second in terms of both number of contacts and amount of time spent was informal interaction with staff. The likelihood is considered very low that either self report or some a priori category system would capture the somewhat startling finding that a major activity in which child advocates engage during a normal working day is traveling around from building to building within the institution which they serve. Thus another demonstration is provided of the importance of collecting naturalistic data and of tying analysis procedures to those data. These particular data also provide some good illustrations of other uses which may be made of such naturalistic ecological information such as management and planning. For example, once the actual activities performed in particular jobs can be specified, then work outcomes might be projected more accurately and work load assignments made more effectively.

Summary

In summary, then, naturalistic, ecological data are urgently needed concerning the behavior of educational administrators. Such data can considerably change the knowledge base of the field and may also speak

to such operational concerns as management and planning. A running narrative record called a chronolog has been developed at Indiana University which can be used to reliably collect such data. Two data reduction steps of unitization and categorization are then used to analyze such data with the naturally occurring structure of the behavior emerging from the data and the category system being tied to that structure. Studies so far have investigated the behavior of a university administrator, superintendents, principals, school psychologists and child advocates. An earlier study using a similar method explored differences between effective and ineffective teachers. Potential contributions of naturalistic methodologies to the overall study of administrative behavior are discussed.

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